

[0091] What is claimed is:

1. An apparatus comprising:
  - three quarter-wavelength differential transmission lines to couple two differential input ports to two differential output ports in a first manner; and
  - a quarter-wavelength differential transmission line to couple one of said two differential input ports to one of said two differential output ports in a second, different manner.
2. The apparatus of claim 1, wherein said first manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals, and said second manner is to couple positive terminals to negative terminals.
3. The apparatus of claim 1, wherein said first manner is to couple positive terminals to negative terminals, and said second manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals.
4. The apparatus of claim 1, wherein said three quarter-wavelength differential transmission lines and said quarter-wavelength differential transmission line have substantially equivalent impedances.
5. The apparatus of claim 1, wherein at least one of said differential transmission lines is selected from a group including: a differential micro-strip transmission line, a differential strip-line transmission line, and a differential coaxial cable.
6. The apparatus of claim 1, wherein at least one of said differential transmission lines is part of a printed circuit board.
7. The apparatus of claim 1, further comprising:
  - a source of a first differential signal coupled to a first of said differential input ports;
  - a source of a second differential signal having substantially the same frequency as said first differential signal coupled to a second of said differential input ports.
8. The apparatus of claim 7, further comprising:
  - a first load element coupled to said first differential output port;

a second load element having substantially the same input impedance as said first load element coupled to said second differential output port.

9. An apparatus comprising:

a first group of six reactive elements to couple two differential input ports to two differential output ports in a first manner;

a second group of two reactive elements to couple one of said two differential input ports to one of said two differential output ports in a second, different manner; and

a third group of four reactive elements, each to couple a positive terminal and a negative terminal of a respective one of said two differential input ports and said two differential output ports.

10. The apparatus of claim 9, wherein said first manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals, and said second manner is to couple positive terminals to negative terminals.

11. The apparatus of claim 9, wherein said first manner is to couple positive terminals to negative terminals, and said second manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals.

12. The apparatus of claim 9, wherein at least one of said reactive elements is a discrete component.

13. The apparatus of claim 9, wherein reactive elements of said first group and said second group have substantially equivalent inductive impedances and reactive elements of said third group have substantially equivalent capacitive impedances.

14. The apparatus of claim 9, wherein reactive elements of said first group and said second group have substantially equivalent capacitive impedances and reactive elements of said third group have substantially equivalent inductive impedances.

15. The apparatus of claim 14, further comprising:

a supply coupled to center taps of said reactive elements of said third group.

16. The apparatus of claim 14, further comprising:

a supply return coupled to center taps of said reactive elements of said third group.

17. A communication device comprising:

- a dipole antenna;
- a power amplifier coupled to said dipole antenna; and
- a combiner coupled to said power amplifier, wherein said combiner includes at

least:

- three quarter-wavelength differential transmission lines to couple two differential input ports to two differential output ports in a first manner; and

- a quarter-wavelength differential transmission line to couple one of said two differential input ports to one of said two differential output ports in a second, different manner.

18. The communication device of claim 17, wherein said first manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals, and said second manner is to couple positive terminals to negative terminals.

19. The communication device of claim 17, wherein said first manner is to couple positive terminals to negative terminals, and said second manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals.

20. A communication device comprising:

a dipole antenna;

a power amplifier coupled to said dipole antenna; and

a combiner coupled to said power amplifier, wherein said combiner includes at least:

a first group of six reactive elements to couple two differential input ports to two differential output ports in a first manner;

a second group of two reactive elements to couple one of said two differential input ports to one of said two differential output ports in a second, different manner; and

a third group of four reactive elements, each to couple a positive terminal and a negative terminal of a respective one of said two differential input ports and said two differential output ports.

21. The communication device of claim 20, wherein said first manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals, and said second manner is to couple positive terminals to negative terminals.

22. The communication device of claim 20, wherein said first manner is to couple positive terminals to negative terminals, and said second manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals.

23. The communication device of claim 20, wherein reactive elements of said first group and said second group have substantially equivalent inductive impedances and reactive elements of said third group have substantially equivalent capacitive impedances.

24. The communication device of claim 20, wherein reactive elements of said first group and said second group have substantially equivalent capacitive impedances and reactive elements of said third group have substantially equivalent inductive impedances.

25. A communication system comprising:

a first communication device; and

a second communication device, said second communication device including at least:

a combiner including at least:

a first group of six reactive elements to couple two differential input ports to two differential output ports in a first manner;

a second group of two reactive elements to couple one of said two differential input ports to one of said two differential output ports in a second, different manner; and

a third group of four reactive elements, each to couple a positive terminal and a negative terminal of a respective one of said two differential input ports and said two differential output ports.

26. The communication device of claim 25, wherein said first manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals, and said second manner is to couple positive terminals to negative terminals.

27. The communication device of claim 25, wherein said first manner is to couple positive terminals to negative terminals, and said second manner is to couple positive terminals to positive terminals and to couple negative terminals to negative terminals.

28. The communication device of claim 25, wherein reactive elements of said first group and said second group have substantially equivalent inductive impedances and reactive elements of said third group have substantially equivalent capacitive impedances.

29. The communication device of claim 25, wherein reactive elements of said first group and said second group have substantially equivalent capacitive impedances and reactive elements of said third group have substantially equivalent inductive impedances.